

REDESCRIPTION OF THE ASCARIDOID NEMATODE *HYSTEROHYLACIUM*  
*SCOMBEROMORI* (YAMAGUTI) FROM AUSTRALIAN SPANISH MACKEREL  
*SCOMBEROMORUS COMMERSION* (LACEPÈDE)

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Bruce, N.L. 1990 08 31: Redescription of the ascaridoïd nematode *Hysterothylacium scomberomori* (Yamaguti) from Australian spanish mackerel *Scomberomorus commerson* (Lacepède). *Memoirs of the Queensland Museum* 28(2): 427-434 Brisbane. ISSN 0079-8835.

Stomachs of 5 species of mackerel were examined. *Hysterothylacium* were obtained only from *Scomberomorus commerson*. *Hysterothylacium scomberomori* is redescribed, together with comments on another undescribed species, *Goezia aspinulosa* Arya is placed in synonymy with *H. scomberomori*. The other ascaridoïds recorded from mackerels are discussed. Notes are included on *Hysterothylacium* sp. which occurs concurrently with *H. scomberomori* in stomachs of *Scomberomorus commerson*. □Ascaridoïd nematode, *Hysterothylacium*, mackerel, *Scomberomorus commerson*.

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Ascaridoïd nematodes from Australian pelagic marine fishes were reviewed by Bruce and Cannon (1989). Since the completion of that work a small number of specimens has been collected from *Scomberomorus commerson* (Lacepède) from Queensland waters. The specimens proved to belong to two species of *Hysterothylacium* Ward and Magath: *H. scomberomori* (Yamaguti, 1941) and an undescribed species. The undescribed species is represented by four mature females, but no males. This record of *H. scomberomori* brings the total number of adult marine species of the genus recorded from Australia (Bruce, 1990; Bruce and Cannon, 1989) to nine.

Five species of mackerel were examined for worms. With the exception of one worm from the Solomon Islands, all were collected from eastern Queensland. The species examined were: *Scomberomorus commerson* (Lacepède), Lizard Island (northern Great Barrier Reef) (19 examined), Heron Island (southern Great Barrier Reef) (14), southeastern Queensland (10); *Scomberomorus munroi* Collette and Russo, southeastern Queensland (35); *Scomberomorus queenslandicus* (Munro), Heron Island (1), southeastern Queensland (34); *Scomberomorus semifasciatus* (Lacepède), Lizard Island (5); *Grammatorecynus bicarinatus* (Quoy and Gaimard), Lizard Island (7). Nomenclature for the hosts follows Collette and Russo (1984).

All material is housed in the Lower Invertebrates collections of the Queensland Museum (QM). Abbreviations used are BL - body length; ED - ejaculatory duct. All measurements are in

microns ( $\mu\text{m}$ ) unless otherwise indicated and were obtained using a calibrated micrometer eyepiece. Numbers in the figure caption refer to specimens numbered in the collection.

SYSTEMATICS OF ASCARIDOIDS  
FROM MACKERELS

Mackerels of the genera *Scomber* and *Scomberomorus* are important food fishes in many parts of the world. Larval ascaridoïds, commonly of the genera *Anisakis* Dujardin, *Contraecaecum* Railliet and Henry, *Hysterothylacium* Ward and Magath and *Terranova* Leiper and Atkinson, have been widely reported in mackerel hosts (e.g., Beumer *et al.*, 1982; Cannon, 1977; Korotaeva, 1974; Oshima, 1972). Not surprisingly there are many nominal species. Most of these are unidentifiable by contemporary standards, with brief and sometimes unillustrated descriptions. For many of these species there is no information on the whereabouts of the type material or, indeed, if there was any. A survey of the literature revealed 9 names which have been established for ascaridoïds with species of *Scomber* or *Scomberomorus* as type host. Of these names I regard four as valid. It is important to recognize that although some of these names are here regarded as *nomina dubia* and are unlikely ever to be resolved, they still remain available. The species involved are listed in Table 1 together with remarks on their status. All names based on larval stages are here regarded as *nomina dubia*.

| SPECIES  | HOST  | REFERENCE                      | TYPES         | REMARKS                           |
|--|---|--------------------------------|---------------|-----------------------------------|
| <i>Goezia aspinulosa</i><br>Arya, 1980                   | <i>S. guttatus</i>                          | present work                   | Jodhpur Univ. | Synonym of <i>H. scomberomori</i> |
| <i>Dujardinascaris cybii</i><br>Arya and Johnston, 1978  | <i>S. guttatus</i>                          |                                | ?             | larva of <i>Terranova</i> ?       |
| <i>Hysterothylacium fortalazae</i><br>(Klein, 1973)      | <i>S. brasiliensis</i><br>and spp.          | Deardorff and Overstreet, 1981 | OCI           | valid                             |
| <i>Porrocaecum paivai</i><br>Silva Motta and Gomes, 1968 | <i>S. cavalla</i>                           |                                | OCI           | valid, <i>incerta cedis</i>       |
| <i>Ascaris papilligerum</i><br>Creplin, 1846             | <i>Scomber scomber</i>                      | Stossich, 1896                 | ?             | valid, <i>nomen dubium</i>        |
| <i>Ascaris pedum</i><br>Deslongschamps, 1824             | <i>Scomber scomber</i>                      | Stossich, 1896                 | ?             | <i>nomen dubium</i>               |
| <i>Hysterothylacium saba</i><br>(Yamaguti, 1941)         | <i>Scomber japonicus</i><br>and spp.        |                                | MPM           | valid                             |
| <i>Hysterothylacium scomberomori</i><br>(Yamaguti, 1941) | <i>S. sinensis</i> ,<br><i>S. commerson</i> | present work                   | MPM           | valid                             |
| <i>Ascaris scombromorum</i><br>Stossich, 1892            | <i>Scomber colias</i>                       | Stossich, 1896                 | ?             | larva, <i>nomen dubium</i>        |
| <i>Hysterothylacium</i> sp.                              | <i>S. commerson</i>                         | present work                   |               | known only from females           |

TABLE 1. Ascaridoid species described from type hosts of the genera *Scomber* and *Scomberomorus* (*S.* = *Scomberomorus*; OCI = Oswaldo Cruz Institute; MPM = Meguro Parasitological Museum).

There are several other species, such as *Hysterothylacium fabri* (Rudolphi), *H. aduncum* (Rudolphi) and *H. incurvum* (Rudolphi) (see Mozgovi, 1953; Yamaguti, 1961; Zhukov, 1960), that have been widely recorded from a variety of hosts including scombroid fishes. These species were not established on the basis of type material from *Scomber* or *Scomberomorus* hosts. In many cases the identities of these species are uncertain or, when reassessed, are shown to be misidentifications. Examples of such misidentifications include records of *Maricostula incurva* (in various combinations) from hosts other than *Xiphias* and records of *Hysterothylacium cornutum* (Stossich) from hosts other than tunas (Bruce and Cannon, 1989). Without examination of the material on which the decisions were made, it is not possible to corroborate or refute many of the older determinations. To tabulate the numerous unsubstantiated records of ascaridoids from scombroid

hosts is a task beyond the scope of this work and such records are not included in Table 1.

#### *Hysterothylacium scomberomori* (Yamaguti) (Figs 1, 2)

- Contracaecum scomberomori* Yamaguti, 1941: 362, pl.V, figs 21, 22, text figures 18, 19. — 1962: 30.  
*Contracaecum (Erschovicaecum) scomberomori* — Mozgovi, 1953: 208, fig. 127.  
*Goezia aspinulosa* Arya, 1980: 96, fig. 1.  
*Hysterothylacium scomberomori*. — Deardorff and Overstreet, 1981: 1042.

#### MATERIAL EXAMINED

All from stomachs of *Scomberomorus commerson* (Lacepède). Male, Lizard Island, 5.xi.1988, coll. L.R.G. Cannon and N.L. Bruce. (QM GL10264). Male, 10 females, Heron Island Reef, 26.iv.1988, coll. N.L. Bruce and S. Cook (QM GL10147). 2 females, several immature,

northern side of Wistari Reef, 21.iv.1988, coll. N.L. Bruce and S. Cook (QM GL10148). 2 damaged females, 2 immature, Heron Island Reef, 25.iv.1988, coll. N.L. Bruce and S. Cook (QM GL10146). 2 females (frozen sample), off Moreton Island, iv.1988, coll. S. Watson and N.L. Bruce (QM GL10265). 2 males, Moreton Bay, 12.ii.1989, coll. T.H. Cribb (QM GL10343). Female, Vana Vana, Solomon Islands, viii.1988, coll. CSIRO (QM GL10266).

#### TYPES

Believed to be held at the Meguro Parasitological Museum, Tokyo, Japan. S. Kamegai (*in litt.*) informs me that the collection was received in poor condition, uncatalogued, and therefore type specimens cannot be identified.

#### TYPE LOCALITY

Yamaguti (1941) merely stated 'Pacific'. Collette and Russo (1984) give the distribution of the type host from Japan to Cambodia and Vietnam. The probable type locality can therefore be restricted to north western Pacific.

#### TYPE HOST

Yamaguti (1941) gave *Scomberomorus chinensis* as the host for his material. The currently accepted name and spelling (Collette and Russo, 1984) is *Scomberomus sinensis* (Lacépède).

#### DIAGNOSIS

Cuticle with distinct cuticular rings. Lips with length to width ratio 1: 1.08-1.33 (mean = 1.14, n=5), with deep postlabial grooves; lateral constriction wide, positioned slightly less than one third length from anterior. Alae commence posterior to ventral postlabial groove of subventral lips. Caudal papillae pairs: precloacal 28-33; paraclacal 2-3; postcloacal 7-11, without doubled papillae; medioventral precloacal organ present. Postcloacal pad present. Spicules approximately equal in length, 1: 1.02-1.09, 3.01-4.60% BL. Tail apex with 5-7 small acute spines.

#### DESCRIPTION

Based on 3 mature males, 1 mature female and 4 immature females.

*General.* Body reaching greatest width about midbody. Dorsal lip slightly shorter than subventrals, flanges moderately developed, triangular. Interlabia prominent, not extending beyond anterior of oesophagus, less than half

length of lips. Oesophagus 6.97-7.83% BL. Ventriculus narrower than widest level of oesophagus, longer than wide. Ventricular appendage 27.9-37.5% length of oesophagus. Intestinal caecum 18.2-25.0% length of oesophagus. Nerve ring lying between anterior 25.6-29.4% of oesophagus. Excretory system filamentar, unilateral, with canal extending slightly anterior to commissure, posteriorly beyond ventriculus.

*Male.* Body 19.2-43.8 mm long, 353-818 maximum width; width at intestinal/oesophageal junction 273-395; ratio of greatest width to length 1: 42.1-54.4. Dorsal lip 71 long by 94 wide (one specimen); subventral lips 85-141 long by 94-150 wide. Nerve ring 442-630 from anterior. Excretory pore 470-705 from anterior. Oesophagus 1504-2632 long by 118-179 wide. Ventriculus 71-118 long by 82-141 wide; ventricular appendage 564-799 long by 47-66 maximum width. Intestinal caecum 273-658 long by 108-188 wide. Ejaculatory duct 1,692-3,854 long, 8.8-10.6% BL. Spicules 884-1,363 long, 37.9-52.2% ED. Caudal papillae pairs 40-43, changing from button to mamillate at about 8th anterior to cloaca. Tail tapering evenly, 155-329 long.

*Female.* Body 28.3 mm long, 705 maximum width; width at oesophageal/intestinal junction not observed; ratio of maximum width to length 1: 40.1. Dorsal lip 118 long by 127 wide. Subventral lip 122 long by 136 wide. Nerve ring and excretory pore not observed. Oesophagus 1974 long by 188 wide. Ventriculus 235 long by 160 wide; ventricular appendage lost in dissection. Intestinal caecum 432 long by 235 wide. Vulva opening 10.0 mm or 35.3% BL from anterior, vulva area not swollen. Vagina 3290 long; uterus undivided for 846, divided part 3478. Eggs about 47. Tail 564 long.

*Immature females.* Body length 12.5-22.5 mm. Oesophagus 1105-1739 long by 84-122 wide; 7.73-9.30% BL. Ventricular appendage 376-564 long by 33-71 wide; 31.85-39.29 length of oesophagus. Intestinal caecum 165-371 long by 66-118 wide; 14.57-21.33% length of oesophagus. Vulva 4.57-8.34 mm or 28.90-37.04% BL from anterior.

*Variation.* The largest males (QM GL10342) have the tail more abruptly narrowed than shorter males and also have a greater number of postcloacal papillae (11) than the smaller males (7-8).

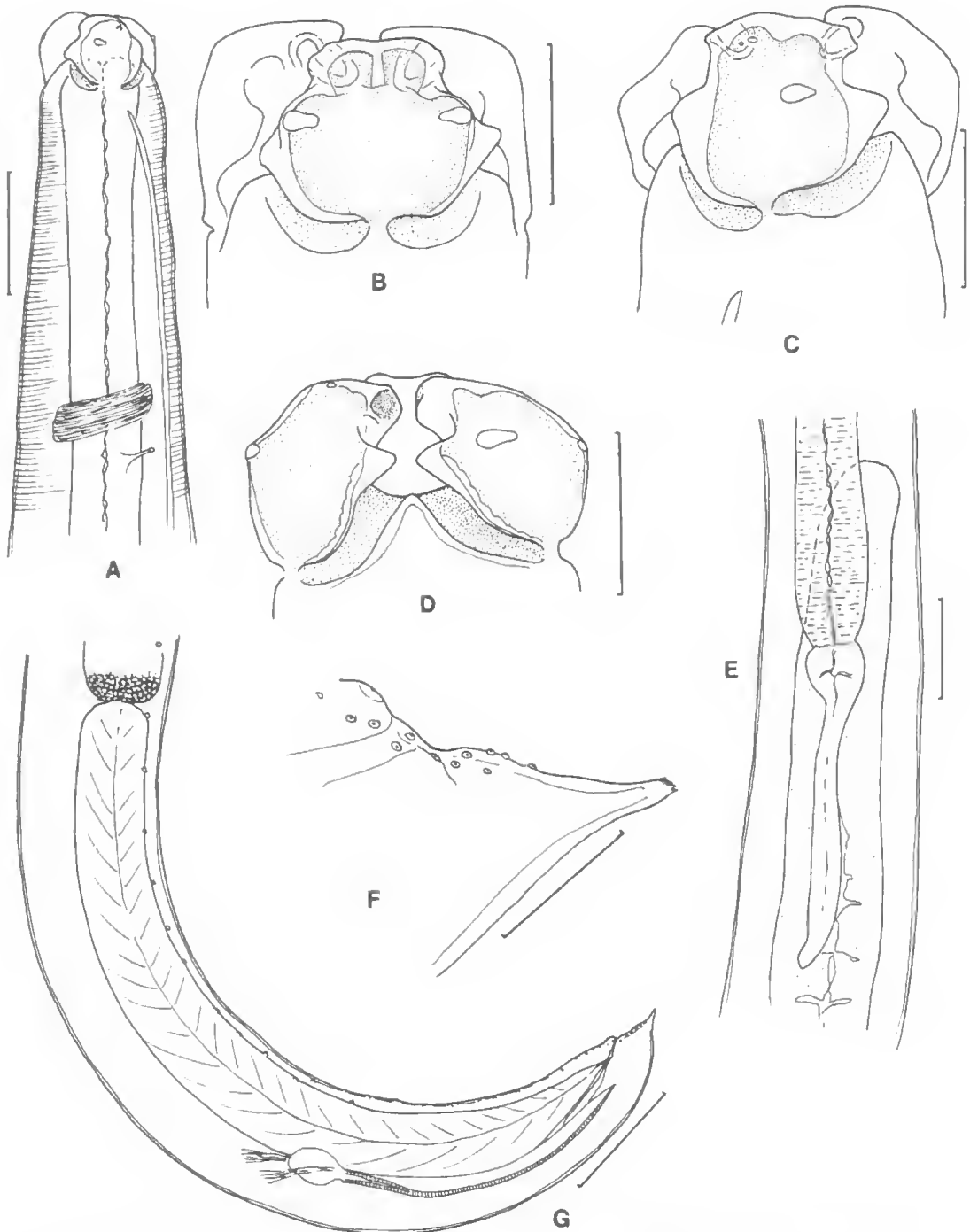


FIG. 1. *Hysterothylacium scomberomori*. A, anterior end, ♂ #1 (scale bar 200 $\mu$ m); B, dorsal lip, ♀ #5 (100 $\mu$ m); C, subventral lip, ♂ #2 (100 $\mu$ m); D, interlabium, ♂ #2 (100 $\mu$ m); E, ventricular region, ♂ #2 (200 $\mu$ m); F, tail, lateral view, ♂ #2 (100 $\mu$ m); G, caudal area, ♂ #2 (400 $\mu$ m).

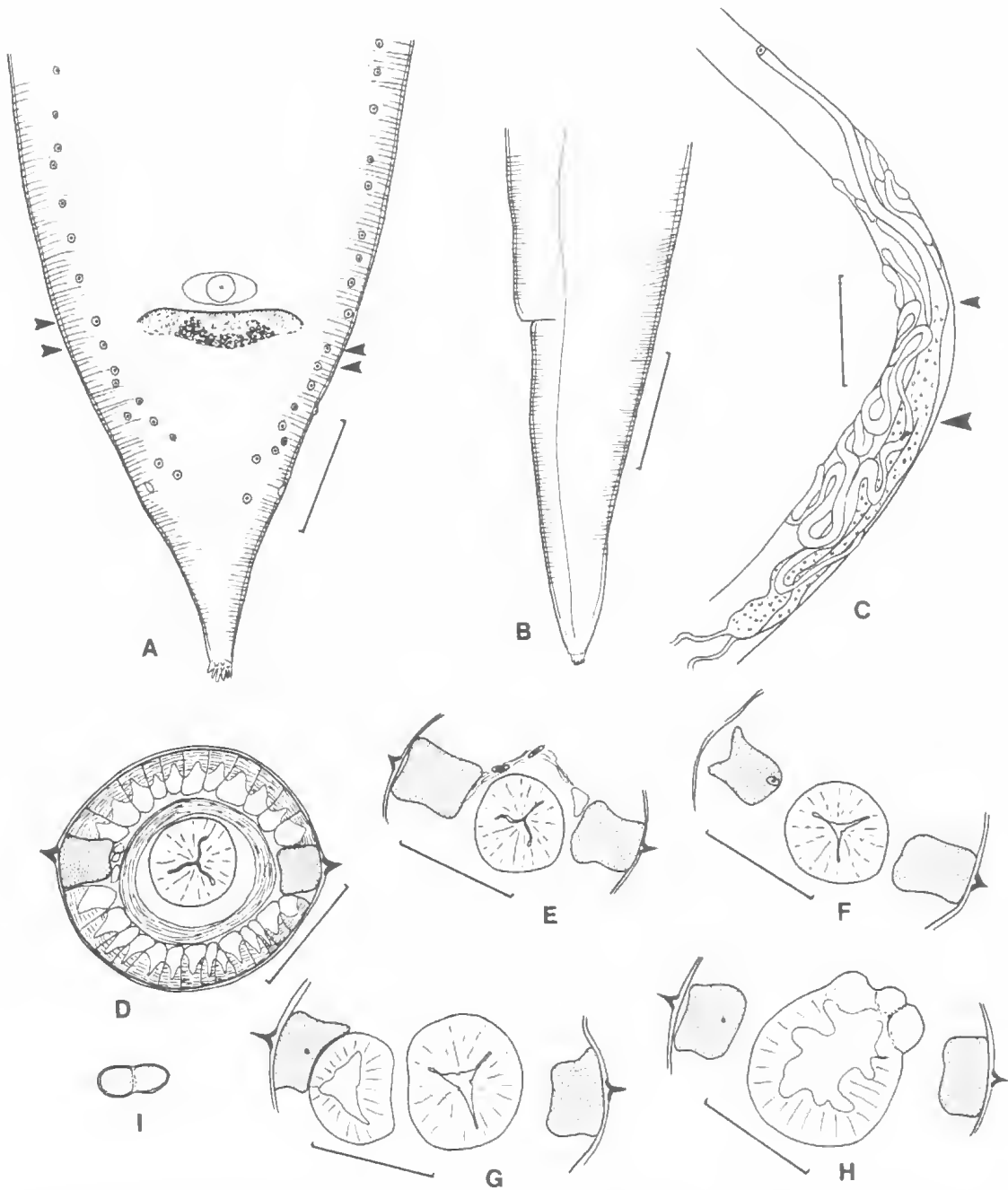


FIG. 2. *Hysterothylacium scomberomori*. A, tail, ventral view, ♂#1; arrows indicate deemed paracloacal papillae (scale bar 50µm); B, tail, lateral view, ♀#2 (200µm); C, reproductive tract, ♀#5; small arrow indicates end of vagina, large arrow indicates point of division of uterus (1.0mm). Sections (from immature female, scale bars all 50µm): D, through nerve ring; E, excretory commissure; F, about 80µm posterior to nerve ring; G, anterior of intestinal caecum; H, posterior of ventriculus; I, mid-ventricular appendage.

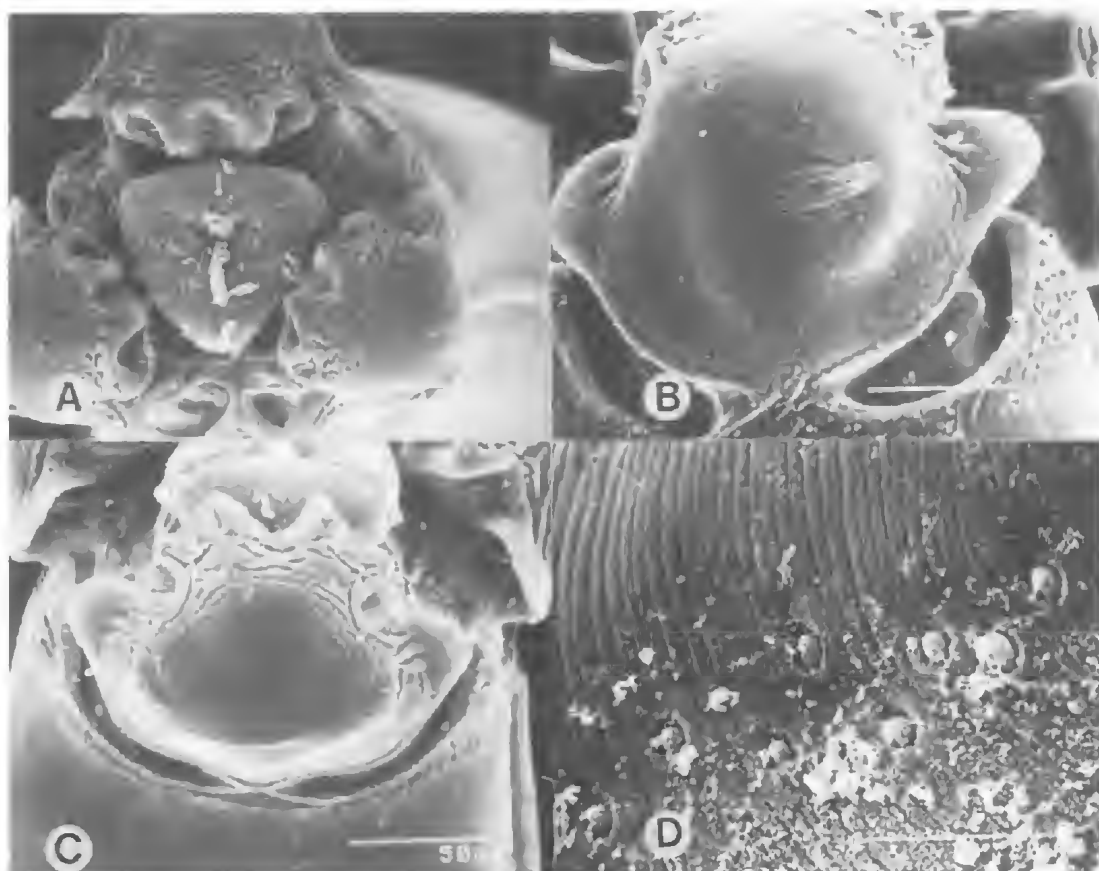


FIG. 3. *Hysterothylacium scomberomori*. Scanning electron micrographs. A, en face; B, subventral lip; C, dorsal lip; D, postcloacal papillae.

#### HOSTS

Australian material recorded only from *Scomberomorus commerson*; also *Scomberomorus sinensis* (type host) and *Scomberomorus guttatus* (Bloch and Schneider) by Arya (1980, see synonymy).

#### DISTRIBUTION

In Australia, at least in Queensland, presumably throughout the range of *Scomberomorus commerson*. One specimen recorded from Solomon Islands. Also India (Arya, 1980) and within the range of *Scomberomorus sinensis*, that is, southeast Asia to Japan (Collette and Russo, 1984) if the type host was correctly identified.

#### REMARKS

The adult male material at hand agrees well with the brief description and figures of Yamaguti (1941). Particular points of correspon-

dence include the proportions of the oesophagus, intestinal caecum and ventriculus, the caudal papillae and spicule details and the description of the tail. Other ascaridoid species described from *Scomberomorus* hosts are *Hysterothylacium fortalazae* (Klein) (Deardorff and Overstreet, 1981), *Porrocaecum (P.) paivai* Silva Motta and Gomes, 1968, *Dujardinascaris cybii* Arya and Johnston, 1978 and *Goezia aspinulosa* Arya, 1980.

*Hysterothylacium fortalazae* is easily distinguished by the prominent cervical alae, more spinose tail apex and fewer precloacal papillae. Of the remaining species, *Porrocaecum (P.) paivai* should be treated as *incertae sedis* until more fully described. However, it differs from *H. scomberomori* in having wider alae and, most notably, in lacking a ventricular appendage. From the brief description and rudimentary figures, *Dujardinascaris cybii* cannot be as-

signed to a genus. It was listed as *incertae sedis* by Soota (1983)

*Goezia aspinulosa* is obviously not a species of *Goezia* and, as figured, has the characteristics of an *Hysterothylacium*. Soota (1983) commented that the species lacked cuticular spines. The description and figures given by Arya (1978), consisting largely of family or generic characters, are not adequate to allow absolute resolution of the identity of the species. The general correspondence of lip size, prominent cuticular rings, tail ornamentation, spicule size, and morphology of the ventricular appendage and intestinal caecum strongly suggests that *G. aspinulosa* is a junior synonym of *H. scomberomori* and is so included in the synonymy.

Data taken from immature females are included to illustrate the constancy of proportions of the characters listed.

#### *Hysterothylacium* sp.

A second species of *Hysterothylacium* (represented by four mature females QM GL10267) was collected from the stomach of one specimen of *Scomberomorus commerson* from Heron Island together with immature specimens of *H. scomberomori*. This worm is easily distinguished from *H. scomberomori* (including synonyms and related species) by the following: alae starting immediately posterior to postlabial groove; long intestinal caecum (75.7-78.4% length of oesophagus), longer ventricular appendix (52.7-58.1% length of oesophagus), a bluntly rounded tail with conical nodulose apex, oviducts extending 1.5- 2.5mm anterior to the vagina and the uterus with the undivided portion (3854) approximately equal in length (93.2%) to the undivided portion (4136) in the dissected female. This latter character is very different in *H. scomberomori*, which has the undivided part 24.3% the length of the divided part.

Without adult males, it is not possible to give a full and diagnostic description of this species or to be sure if it has previously been described. The specimens are recorded here to draw attention to the presence of two species of *Hysterothylacium* that can be found in *Scomberomorus* hosts in Australia and that can occur together within the single host stomach.

Additionally two immature specimens from *Scomberomorus queenlandicus* were

tentatively identified as belong to this species rather than *H. scomberomori*

#### ACKNOWLEDGEMENTS

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